

CLAIMS

We claim:

1. A suspended rotating fixture configured to be immersed within a fluidic and electrically conducting fluid medium and to be suspended from a rotating electrically conductive shaft unit connected to a first side of a power supply and configured to support at least one electrically conductive element within said electrically conductive fluid medium connected to the second side of said power supply, said shaft unit comprising:

an element support structure to support at least one of said elements, said element support structure including opposite aligned first and second end shaft members for a rotating support of said element support structure;

first and second suspension units connected to said shafts of said element support structure to support said fixture from said rotating electrically conductive shaft unit with the element support structure immersed within said electrically conductive fluid medium, a first of said suspension units being a flexible suspension unit including a first rotating member conductively fixed to a first of said end shaft members and a second spaced rotating member aligned with said first rotating member and forming a part of said rotating electrically conductive shaft unit, and a flexible electrically conductive belt member coupled to said first and second rotating members to support said fixture from said rotating electrically conductive shaft unit.

2. The suspended rotating fixture of claim 1 wherein said belt member and said first and second rotary members are constructed to minimize coating thereof with said fluid medium.

3. The suspended rotating fixture of claim 1 wherein said first and second rotating members of said first suspension unit include conductive sprockets and said flexible electrically conductive belt member is a chain unit mating with said sprockets.

4. The suspended rotating fixture of claim 3 wherein said chain and sprocket include mating elements interacting to remove coating from the same.

5. The suspended rotating fixture of claim 3 wherein the second of said suspension units include an electrically conductive chain coupled to an electrically conductive mating sprockets corresponding to the first suspension unit.

6. The assembly of claim 1 wherein said fixture includes a barrel having said shafts extending from opposite ends of the barrel, said electrical conductive suspension unit means including first and second flexible and electrically conductive endless members connected one to each of said shafts and to said rotating shaft.

7. The suspended rotating fixture of claim 1 wherein said fixture includes a rotating apertured container, and having said first and second end shafts conductively fixed to the opposite ends of the container.

8. The suspended rotating fixture of claim 1 or 7 in combination with said rotating conductive support shaft unit configured to be releasably mounted within a conveyor including a series of element support units, said conveyor including a grounding unit coupled to said rotating conductive support unit to connect the conductive shaft of said fixture to ground.

9. The fixture of claim 8 wherein said conveyor is a slide rail conveyor with slide rails to each side of the fixture and each including a series of like electrically conductive slide bars connected to said ground unit, each of said rotating electrically conductive shaft units including a frame unit mounted to said slide bars and including a rotating electrically conductive shaft within said frame unit coupled to said electrical grounding unit.

10. The fixture of claim 1 wherein said fixture includes a rotating barrel for small parts, said barrel having said first and second end shaft members extending from opposite ends of the said barrel, sprockets connected one to each of said first and second end shafts and aligned sprockets connected to said rotating electrically conductive shaft unit, each of said suspension units including first and second flexible and electrically conductive endless chains connected one to each of said aligned sprockets secured to each of said end shaft members and to said sprocket secured to said rotating electrically conductive shaft unit.

11. The suspended rotating fixture of claim 1 wherein said fixture is an electrically conducting barrel having parallel end walls with said first and second end shafts secured thereto, a frame structure with said rotating electrically conductive shaft unit rotatably mounted therein, said frame structure constructed to be releasably
5 mounted within an electrical conductive conveyor unit for selective immersion of said barrel within a series of tanks at least some of which include said electrically conductive medium for treating parts within said barrel.

12. The fixture of claim 10 wherein each of said electrically conductive suspension units includes an electrically conductive chain coupled to matching sprocket on said rotating shaft and to said end shafts of said barrel to rotate said barrel and establish said electrical grounding of said barrel.

13. The rotating drive and support assembly of claim 12 wherein said chain is a self-cleaning chain to maintain the conductivity of the chain and the connection of the chain to the frame and to the barrel.

14. The rotating drive and support assembly of claim 12 wherein said chain is a spreader chain.

15. The rotating drive and support member of claim 14 wherein said chain includes a series of links, each link including an open frame with an integral offset neck with the offset neck constructed to connect within the open frame of the adjacent link to form an endless electrically conductive chain.

16. The assembly of claim 15 wherein said frame and neck are formed with a rectangular cross-section with sharp edges to establish a non-clogging chain with the links in electrical contact with each other.

17. A rotating drive and support assembly for treating elements in a barrel within a liquid comprising a mounting structure including an electrically conductive and grounded frame unit including a rotatable shaft, a barrel adapted for containing small parts and including projecting shaft members from the opposite ends of the
5 barrel for rotatably mounted thereof, said barrel including a container connected to said shaft member and having openings for introduction of a conductive liquid with

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said shaft member within said liquid, first and second corresponding drive assemblies each coupling of one of said projecting shaft members to said rotatably shaft, each drive assembly including a first sprocket and a second sprocket connected
10 directly to said shaft of said frame shaft and said fixture and a chain connecting said sprockets.

18. The assembly of claim 17 wherein said sprocket and chain are formed with a rectangular cross-section with sharp edges to establish a non-clogging chain drive and with the links in electrical contact with each other.

19. The assembly of claim 17 wherein said grounded frame unit includes a spring loaded grounding contact unit for engaging a fixed grounded support.

20. The rotating drive and support assembly of claim 17 in combination with a processing line including a plurality of process stations, a conveyor having a series of like support means for receiving and supporting said frame units, said support means being connected to electrical ground to ground said frame, and means
5 for moving said conveyor to align said support means and connected barrel with said process stations.

21. The assembly of claim 20 including a lift system connected to the conveyor and operable to raise and lower the conveyor and thereby the barrels into and from the treating stations, said lift system including a common elongated lift frame extended the length of the line including all said treating stations, a plurality of
5 lift units connected to spaced locations along the conveyor and connected to said elongated lift frame to raise and lower said barrels.

22. The assembly of claims 21 wherein each said conveyor lift unit includes a chain connected to the conveyor frame at each station, a chain sprocket member secured to the conveyor in line with each chain, said chain being wrapped over the sprocket member and connected to the elongated lift frame member.

23. An apparatus for processing of parts within a barrel immersed in an e-coating medium and mounted within a conveyor unit; comprising a barrel having a supporting shaft, a barrel support unit including a rotating shaft constructed for

connection to an electrical ground and supported to lower and raise the barrel into
 5 and from a treatment tank, means to ground said rotating shaft, each said supporting
 shaft and said barrel shaft having a electrically conductive sprocket affixed to the
 respective shafts and having the sprocket members in alignment, and an electrically
 conductive endless chain members connected about said sprockets and supporting
 said barrel for rotation in response to rotation of said rotating shaft with said barrel
 10 including said support shaft within said e-coating medium, and driven gear
 connected to said rotating shaft, a driven gear coupled to said rotating shaft.

24. The apparatus of claim 23 including said conveyor including a series
 of conveying supports for said barrel support units, said conveying supports mounted
 in a slide rail unit, a beam support connected to said conveying supports, a rack unit
 connected to said slide rail unit, said rack unit having a frame secured to said slide
 5 rail and moving with the slide rail and a rack mounted to said frame, and an actuator
 connected to said rack and mounted to said frame for selective rotation of said sock
 and said drive gears of said load bar units.

25. The apparatus of claim 24 wherein said means to ground includes a
 grounding unit secured to said conveyor, said grounding unit comprising a grounding
 plate aligned with said rack unit, spring loaded clamping units securing said
 grounding plate to said rack unit and biasing said plate into engagement with said
 5 grounded frame member and thereby connecting said load bar and barrel to ground.

26. The apparatus of claim 24 wherein said grounding unit comprising an
 electrically conductive support member secured to the conveyor in electrical
 conductive contact with the load bar unit, said grounding unit including a spring-
 loaded contact plate secured to said conductive support member and resiliently
 5 engaging an electrically conductive grounded frame member.